carte de la contrée aurifère

BLACK RIVER

COPPER MINING COMPANY.

GEOLOGICAL SURVEY AND REPORT,

BY DR. C. T. JACKSON,

OCTOBER 22, 1862.

BOSTON:
PRESS OF GEO. C. RAND & AVERY, 3 CORNHILL,
1862.

REPORT

UPON THE PROPERTY OF THE

BLACK RIVER MINES,

SITUATED IN LOTBENIERE COUNTY, C. E.

BY DR. C. T. JACKSON.

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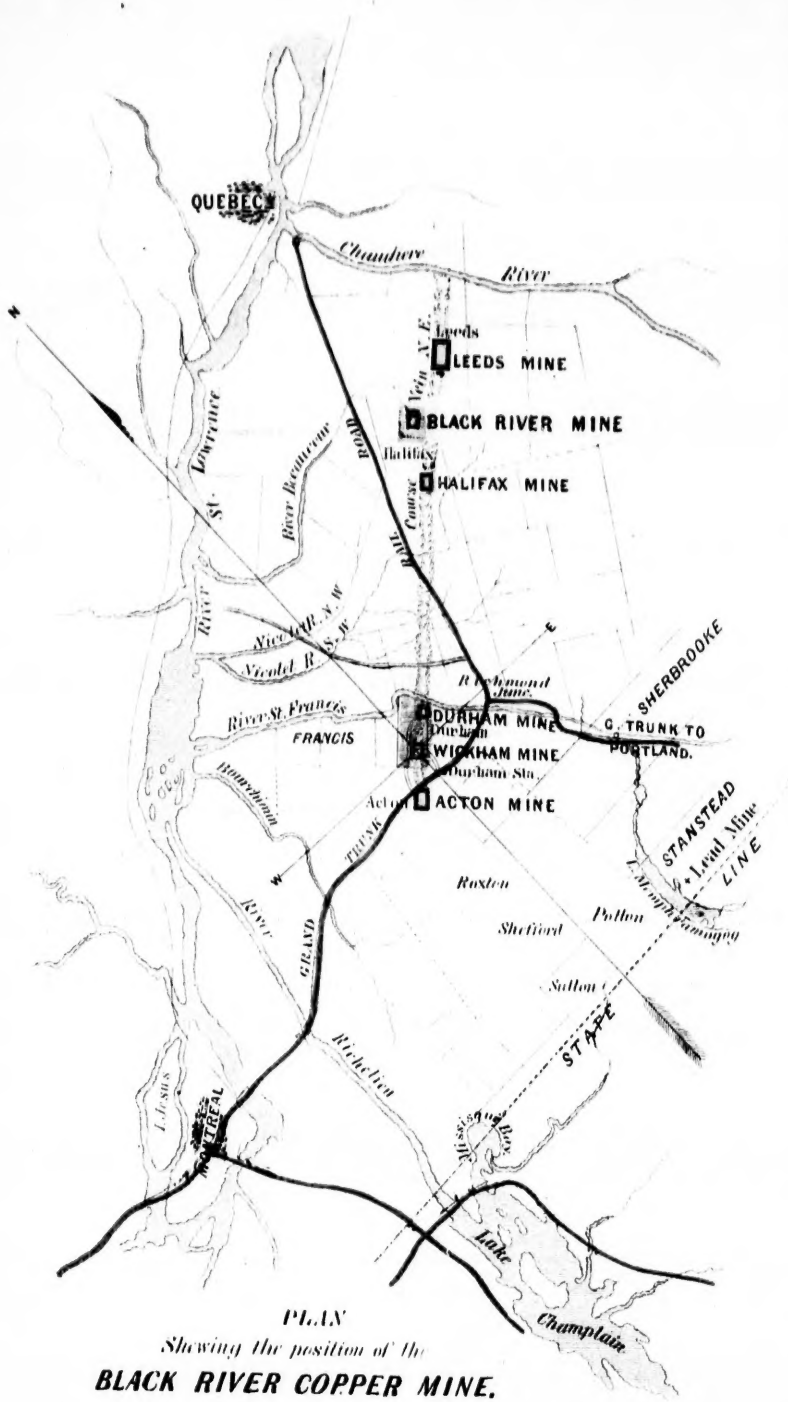

PLAN

Shewing the position of the

BLACK RIVER COPPER MINE.

in Canada East.

J. Pratt & Co Lith. Boston

DR. JACKSON'S REPORT.

BOSTON, OCT. 22, 1862.

EDWARD G. TILESTON, ESQ.

DEAR SIR: At your request and in your company, I visited and examined the Black River Copper Mines in Canada East, and would now record my observations on the same.

SITUATION OF THE MINES.

The Black River Copper Mines are situated in the parish of St. Flavien, Lotbeniere County, in latitude 46°25′ north and longitude 71°30′ west of Greenwich, as appears from the map of Canada, and are in a well-known cupriferous belt, which crosses the country in a nearly north-east and south-west direction. The mineral land comprises 220 acres, 100 of which is Shaw's lot, and 120 is called the Company lot.

Sir William Logan, chief of the Canadian Geological Survey, in his Descriptive Catalogue of the economic minerals of Canada, sent to the London International Exhibition for 1862, states, on page 13: —

BLACK RIVER MINE.

"At St. Flavien, about five leagues above the Chaudiere, and two leagues from the St. Lawrence, red shales occur, underlaid by a band of amygdaloidal diorite; this appears to occupy the place of the magnesian limestone, to which the band at Acton belongs. It is between a quarter and half a mile wide, and limestones occur both at the summit and at the base of the band, which in those parts appear to be of a concretionary or conglomerate and brecciated character; being composed, particularly at the base, of rounded and angular masses of amygdaloidal diorite, varying in diameter from two inches to two feet.

"Many of these are calcareous, and much of the rock is red. The interstices among the masses are filled with calc spar, which is transversely fibrous towards the walls and incloses crystallized quartz in the centre. This band

is highly cupriferous, and ores of copper occur both in the beds and in veins or lodes which cut them: the bearing of the veins, however, being with the strike. The ore in the beds is copper pyrites, large masses of which, similar to the one exhibited, are associated with the limestones at the top. The veins, in addition to copper pyrites, hold the variegated and vitreous sulphurets.

"In one spot, native copper occurs in small masses in the conglomerate at the base of the diorite. The whole band has a striking resemblance to some of the rocks of the upper copper-bearing series of Lake Superior. Quebec group, Lower Silurian."

Sir William states that "six copper-bearing beds or veins, including those of Black River, are all included in the Lauzon and Farnham synclinal." They all belong to the great cupriferous belt above mentioned, as will be seen by the annexed map of the copper region.

The Black River Mines are very favorably situated, not only for mining, but also for convenient transportation of the ores to market, the distance from the Grand Trunk Railway station, at Black River settlement, being only six miles. The country around is settled by Canadian French people, who seek employment in the fascinating business of mining, and who labor for unusually moderate wages.

GEOLOGY OF THE REGION.

It will hardly be necessary for me to say much on the geology of the Black River Mines after having quoted the compact statement by the distinguished chief of the Canadian Geological Survey. I would merely add that my observations coincide very nearly with his; especially if the lower Silurian is regarded as belonging to the Taconic system of Emmons. The amygdaloidal trap, which is so liberally intermixed with, and even interstratified with the red slates at these mines, resembles the toadstone of Derbyshire, England; the vesicles are very small, and are filled generally with calcareous spar, the removal of which, by the agency of the weather, gives to the surface of the rock that peculiar pitted or variolous aspect, marking it as an ancient lava, or plutonic rock. These trap-

pean masses are very irregularly disposed in the slates, and do not appear to form regular dykes, but seem to have been poured out upon, or in the midst of the strata, anterior to their elevation from their original horizontal situation. There appears to have been but little chemical effervescence produced by the intrusions of the trappean rocks into argillaceous strata, a fact I have for many years observed, and one that is strongly in contrast with the violent chemical reaction which took place when trap rocks, in a state of igneous fusion, were poured out amid sandstone strata, as shown in Nova Scotia, Maine, and on Keweenaw Point and Isle Royale, Lake Superior. Argillaceous materials do not appear to have formed amygdaloid and trappean breccias with the igneous rocks so readily as the sandstones have done. We observe, however, that the oxide of iron in the slates is all per-oxidized, or converted into the red oxide of iron, as seen in the red shales or slates of these mines. This chemical action is very marked, and bears some relation to the gaseous emanations which brought in the copper ores, or the materials which produced these ores. Chloride of copper and sesqui-chloride of iron are very volatile, rising in vapor at a temperature a little above that of boiling water. These chlorides, if they came in contact with another very abundant volcanic exhalation, sulphuretted hydrogen, would be decomposed, and sulphides of iron and of copper would result, and these, by their combination in different proportions, would form vitreous, purple and yellow copper ores, such as we find in the Canadian mines, while both chlorine and the chlorhydric acid would tend to produce from the protoxide, and to diffuse in the soft materials of slaty sediment, the per-oxide of iron. Thus chemistry offers a ready solution to the geological problem of the origin and mode of formation of copper ores, and their deposition in veins and beds in sedimentary rocks. It is highly probable that all metalliferous veins were derived from igneous vapors, exhaled from the interior of the globe. It is

obvious that the theory of sublimation of some ores, as such, cannot be maintained, for they are not volatile, but the matters from which they might be formed are highly volatile, and by double decomposition with other gases and vapors we can see how the ores may have been formed. Galena and cinnabar may be easily sublimed unaltered.

The theory of Werner, which some have lately attempted to revive, is simply absurd, for the ores are not soluble in water. Nor can we galvanize a non-cupriferous rock so as to make it segregate copper. The copper ores must all have been derived from below, and probably by vaporous sublimation. This volcanoes prove in the most positive manner, as may be seen at their fumaroles and in volcanic craters.

Iron ores, copper ores, lead ores, and even gold have been brought up from below by metalliferous vapors. Gold probably was conveyed by the sesqui-chloride of iron, the decomposition of which, by the action of water, produced specular and magnetic iron ores, and the gold was deposited with them in its metallic state. The oxides of iron we see in the form of black sand everywhere found in gold washings.

The Chaudiere region is also auriferous; and I obtained some scales of gold from a handful of gravel taken from a small stream near the Black River Copper Mines. I have no doubt that gold will also be found in the copper ores of these mines.

CHARACTER OF THE COPPER VEINS.

Black River Mines show an abundance of rich copper pyrites at their very outcrops, and the superficial openings that have been made by explorers exhibit the ore to such an extent as to leave no doubt as to the richness of the mineral ground. Some of the veins contain calcareous spar as a vein-stone, and copper ores of various kinds are mixed with it. Other veins have a quartz gangue, or matrix, and the yellow copper pyrites is sometimes intimately mixed with this mineral. All the ores, however, present a good workable appear-

ance, and most of them are sufficiently pure to send to market without any dressing.

Masses of clean ore, some hundreds of pounds in weight, have been taken from these veins, and several tons of rich copper pyrites in large lumps may now be seen on bank at the mines. Some of these masses, at present before me, are six inches thick, and one of them nearly a foot square, and are very clean copper ore.

The course of the copper veins was found to be N. 63° E. S. 63° W., and their general dip is 85°, or very nearly vertical.

This position of the veins is very favorable for mining operations, since perpendicular shafts will keep long in the lode, and the expense of many extensive cross-cuts and winzes in dead ground will be avoided.

I should think, from what I saw, that there was a prospect at this locality for extensive mining operations with reasonable expectations of success. The work done thus far is very superficial, and is such as is usually performed for mere explorations preparatory to mining.

I would add, that the Black River ores may be dressed, like those from Acton and Wickham, to from 15 to 20 per cent. very easily, and much of the ore needs no dressing at all. It may be broken to egg size and be sent to the smelters at once.

Those ores which are mixed with veinstone or rock will, of course, be dressed in the usual way, so as to get clear of all the superfluous rock before sending them to market.

I would also remark, that, since these mines produce two kinds of ores, one mixed with limestone, or calc spar, and the other with quartz, they will flux each other in the smelting furnace.

Respectfully, your obedient servant,

CHARLES T. JACKSON, M.D.
Geologist and State Assayer.

APPENDIX.

BOSTON, Nov. 12, 1862.

EDWARD G. TILESTON, ESQ.

DEAR SIR: I have made a chemical assay of a portion of the mass of solid ore taken from the Company lot, and find that it consists of 84.5 per cent. of copper pyrites, mixed with a little iron pyrites, and the copper contained in 100 parts by weight of the ore — taken without separation from the rock — is 21.7 per cent., and on the ore free from the rock it yields 24.5 per cent. of metallic copper.

One hundred grains of this ore, searched for gold, did not yield a trace of that metal. If it is found in the Black River Mines it will probably be in the iron pyrites, and in the gossan or decayed walls of the lodes, though it is possible that it may exist in some portions of the copper pyrites also.

Respectfully, your obedient servant,

CHARLES T. JACKSON, M.D.,

State Assayer.